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Contextual Information in Anticipation Performance: A Novel Test of Cognitive Load Theory

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The ability to anticipate is essential when performing under severe time constraints. Skilled sports performers use kinematic information from opponents' movements and sources of contextual information (e.g., score, field positions) to facilitate anticipation. Few researchers have investigated the relative importance of these two information sources and, in particular, how context may affect anticipation. We tested the predictions of Cognitive Load Theory (CLT; Sweller, 1988), which has rarely been applied to motor skills, to examine how context affected cognitive load and anticipation. The CLT suggests that context will increase cognitive load in novices but not experts and that increased load is detrimental to performance. Nine skilled and nine novice cricket batters faced bowlers on a life-size screen in four conditions that manipulated access to context and a secondary task. Trials were occluded immediately prior to ball release and anticipation measured by marking predicted location the ball would have passed the stumps on scaled diagrams (McRobert et al., 2009). Secondary task performance, verbal reports, and mental effort scores were recorded. Skilled batters showed better anticipation accuracy ($p < 0.05$) and both groups performed better with context ($p < 0.05$). In dual task conditions, both groups showed an increase in mental effort scores but improved anticipation accuracy (both $p < 0.05$), while secondary task performance was maintained ($p > 0.05$). Verbal reports revealed both groups referred to kinematic information in the absence of context. When context was provided, skilled performers reported statements relating to sequencing and game information in addition to kinematic information, while both groups reported using information concerning opponent positioning. Findings suggest that CLT may not transfer to perceptual-motor skills by showing mental effort was not affected by context in either skill group and the addition of a secondary task actually improved performance.